Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for fitting a set of upper and lower teeth in a masticatory system of a patient, comprising:

digitally modeling a set of teeth in a predetermined position; and

generating a plurality of one or more appliances ~~having cavities~~, said appliances having cavities and wherein the cavities of successive ones of the plurality appliances have different geometries shaped to receive and resiliently reposition teeth from one arrangement to a successive arrangement.

2. (Currently Amended) A method for fitting a set of upper and lower teeth in a masticatory system of a patient, comprising:

modeling a set of teeth in three or more predetermined positions prior to treatment; and

generating an appliance ~~having cavities~~ for each of the three or more predetermined positions, said appliance having cavities and wherein the cavities of successive ones of the plurality appliances have different geometries shaped to receive and resiliently reposition teeth from one arrangement to a successive arrangement.

3. (Currently Amended) A method for fitting a set of upper and lower teeth in a masticatory system of a patient, comprising:

modeling a set of teeth using three or more predetermined molds or casts prior to treatment; and

generating an appliance having cavities for each of the three or more molds or casts, said appliance having cavities and wherein the cavities of successive ones of the plurality appliances have different geometries shaped to receive and resiliently reposition teeth from one arrangement to a successive arrangement.

4. (Original) The method of any of claims 1-3, wherein the modeling the set of teeth comprises selecting one or more arch forms specifying the ideal set of teeth.

5. (Original) The method of claim 4, wherein the masticatory system includes jaws and wherein generating includes:

registering a model of the upper and lower teeth with a model of the masticatory system;

simulating the motion of the jaws to generate contact data between the upper and lower teeth; and

placing a tooth in a final position based on the contact data.

6. (Original) The method of claim 5, wherein the model is registered using X-ray data.

7. (Original) The method of claim 5, wherein the model is registered using computed tomography data.

8. (Original) The method of claim 5, wherein the model is registered using data associated with a mechanical model.

9. (Original) The method of claim 5, wherein the simulating step further comprises applying kinematics to the model of the teeth.

10. (Original) The method of claim 5, wherein the simulating step further comprises applying a constrained motion to the model of the tooth.

11. (Original) The method of claim 5, wherein the placing step is based on a measure of undesirability to the contacts.

12. (Original) The method of claim 11, further comprising optimizing the position of the tooth according to the measure of undesirability.

13. (Original) The method of claim 12, further comprising minimizing the measure of undesirability.

14. (Original) The method of claim 13, wherein the measure of undesirability is a function of one or more of Peer Assessment Rating (PAR) metrics, distance-based metrics and shape-based metrics.

15. (Original) The method of claim 5, wherein the simulating step includes providing a library of motions.

16. (Original) The method of claim 15, wherein the library of motions includes a protrusive motion.

17. (Original) The method of claim 15, wherein the library of motions includes a lateral motion.

18. (Original) The method of claim 15, wherein the library of motions includes tooth-guided motions.

19. (Original) The method of claim 5, wherein the simulating step includes applying physical forces to one jaw.

20. (Currently Amended) The method of claim 5, wherein the placing step further includes updating a ~~the~~ computer representation of the masticatory system with new patient data.

21. (Original) The method of claim 20, wherein the patient has a first teeth model, further comprising:

scanning the teeth of the patient to generate a second teeth model;

matching the second teeth model with the first teeth model;

applying a final position transform to the second teeth model; and

adjusting the position of teeth in the second model based on new information.

22. (Original) The method of claim 21, wherein the matching step compares correspondences between the first and second teeth models.

23. (Original) The method of claim 22, wherein the correspondences include feature correspondences.

24. (Original) The method of claim 21, wherein the new information includes information from a new prescription.